

12/24/00 - 1/5/01 - DC - KN - SWD

ABOVE THIS LINE FOR DIVISION USE ONLY

36340274

NEW MEXICO OIL CONSERVATION DIVISION - Engineering Bureau -

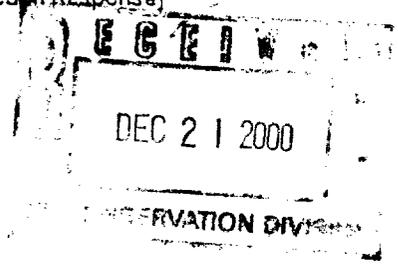
ADMINISTRATIVE APPLICATION COVERSHEET

THIS COVERSHEET IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS

Application Acronyms:

- [NSP-Non-Standard Proration Unit] [NSL-Non-Standard Location] [DD-Directional Drilling] [SD-Simultaneous Dedication] [DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling] [PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement] [WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion] [SWD-Salt Water Disposal] [IPI-Injection Pressure Increase] [EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

Case 12613



[1] TYPE OF APPLICATION - Check Those Which Apply for [A]

- [A] Location - Spacing Unit - Directional Drilling [] NSL [] NSP [] DD [] SD

Check One Only for [B] or [C]

- [B] Commingling - Storage - Measurement [] DHC [] CTB [] PLC [] PC [] OLS [] OLM

- [C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery [] WFX [] PMX [X] SWD [] IPI [] EOR [] PPR

[2] NOTIFICATION REQUIRED TO: - Check Those Which Apply, or [] Does Not Apply

- [A] [] Working, Royalty or Overriding Royalty Interest Owners [B] [X] Offset Operators, Leaseholders or Surface Owner [C] [] Application is One Which Requires Published Legal Notice [D] [X] Notification and/or Concurrent Approval by BLM or SLO U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office [E] [X] For all of the above, Proof of Notification or Publication is Attached, and/or, [F] [] Waivers are Attached

[3] INFORMATION / DATA SUBMITTED IS COMPLETE - Statement of Understanding

I hereby certify that I, or personnel under my supervision, have read and complied with all applicable Rules and regulations of the Oil Conservation Division. Further, I assert that the attached application for administrative approval is accurate and complete to the best of my knowledge and where applicable, verify that all interest (WI, L, ORRJ) is common. I further verify that all applicable API Numbers are included. I understand that any omission of data, information or notification is cause to have the application package returned with no action taken.

Note: Statement must be completed by an individual with supervisory capacity

GARY BEINK
Print or Type Name

[Signature]
Signature

Production Dept.
Title

12/18/00
Date

APPLICATION FOR AUTHORIZATION TO INJECT

Case 12613

I. PURPOSE: Secondary Recovery Pressure Maintenance Disposal Storage
Application qualifies for administrative approval? Yes No

II. OPERATOR: Energen Resources Corporation

ADDRESS: 2198 Bloomfield Highway - Farmington, NM 87401

CONTACT PARTY: Gary Brink PHONE: 505/325-6800

III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? Yes No
If yes, give the Division order number authorizing the project: _____

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

*VIII. Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).

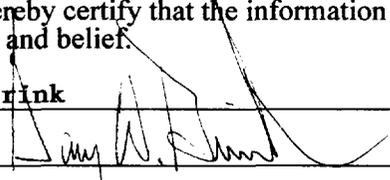
*XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

NAME: Gary Brink TITLE: Production Superintendent

SIGNATURE:  DATE: 12/15/00

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstances of the earlier submittal: _____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate District Office

III. WELL DATA

- A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:
- (1) Lease name; Well No.; Location by Section, Township and Range; and footage location within the section.
 - (2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.
 - (3) A description of the tubing to be used including its size, lining material, and setting depth.
 - (4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District Offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

- B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.
- (1) The name of the injection formation and, if applicable, the field or pool name.
 - (2) The injection interval and whether it is perforated or open-hole.
 - (3) State if the well was drilled for injection or, if not, the original purpose of the well.
 - (4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.
 - (5) Give the depth to and the name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

- (1) The name, address, phone number, and contact party for the applicant;
- (2) The intended purpose of the injection well; with the exact location of single wells or the Section, Township, and Range location of multiple wells;
- (3) The formation name and depth with expected maximum injection rates and pressures; and,
- (4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, 2040 South Pacheco, Santa Fe, New Mexico 87505, within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

INJECTION WELL DATA SHEET

Tubing Size: 2 3/8 4.7# J-55 Lining Material: _____

Type of Packer: Baker Loc-set _____

Packer Setting Depth: 5420' _____

Other Type of Tubing/Casing Seal (if applicable): _____

Additional Data

1. Is this a new well drilled for injection? _____ Yes No

If no, for what purpose was the well originally drilled? _____

A producing West Lindrith Gallup Dakota Well

2. Name of the Injection Formation: Mesa Verde _____

3. Name of Field or Pool (if applicable): Blanco Mesa Verde _____

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plug(s) used. 3878-98' sq. with 100 sx. 7992'-8264' with CIBP @ 7900' Capped w/8 sx. 7104'-7696' 33 sx from 7154'-6719'

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: Pictured Cliffs - 3800', Gallup-Dakota 6800'

INJECTION WELL DATA SHEET

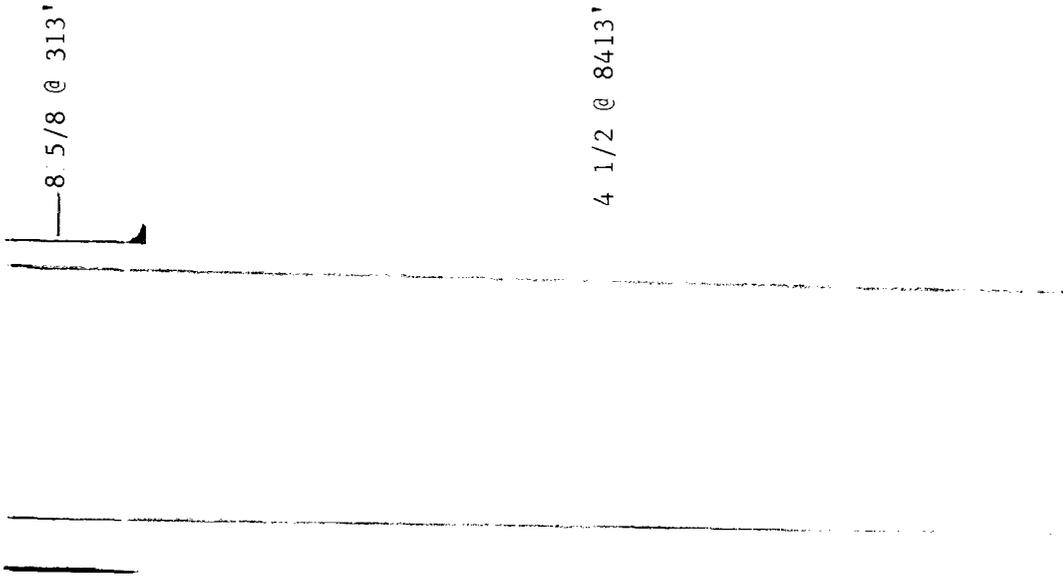
OPERATOR: Energen Resources Corporation

WELL NAME & NUMBER: McCroden #7

WELL LOCATION: 1650' FNL, 790' FWL
FOOTAGE LOCATION

E UNIT LETTER SECTION TOWNSHIP RANGE
12 12 25N 3W

WELLBORE SCHEMATIC



WELL CONSTRUCTION DATA

Surface Casing

Hole Size: 12 1/4 Casing Size: 8 5/8 24# J-55
 Cemented with: 250 sx. or 295 ft³
 Top of Cement: Surface Method Determined: Circ.

Intermediate Casing

Hole Size: _____ Casing Size: _____
 Cemented with: _____ sx. or _____ ft³
 Top of Cement: _____ Method Determined: _____

Production Casing

Hole Size: 7 7/8 Casing Size: 4 1/2 11.6#
 Cemented with: 2490 - 3 stage sx. or 4100 ft³
 Top of Cement: Surface Method Determined: Circ.

Total Depth: 8413'

Injection Interval

5520 feet to 6076

(Perforated or Open Hole; indicate which)



December 15, 2000

Ms. Lori Wrotenberry
New Mexico Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505

RE: Administrative Approval to Inject
Energen Resources Corporation
McCroden #7
1650' FNL, 790' FWL, Sec. 12, T25N, R3W, N.M.P.M.
Rio Arriba County, New Mexico
API #30-039-23555

Dear Ms. Wrotenberry:

Energen Resources Corporation requests administrative approval to convert said well into a Salt Water Disposal Well. Attached is Form C-108 with the required data for application.

In accordance with New Mexico Oil Conservation Division Rules, the surface landowner and offset operators have been furnished a copy of this application by certified mail. Proof of legal notice has been requested for publication in both San Juan and Rio Arriba counties.

If additional information is needed, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Gary W. Brink", written over a white background.

Gary W. Brink
Production Superintendent

GWB/vd

cc: NMOCD – Aztec
BLM – Albuquerque
Offset Operators



**APPLICATION FOR AUTHORIZATION TO INJECT
ENERGEN RESOURCES CORPORATION
McCRODEN #7 SWD**

- V. See Attached Map
- VI. The only well within the area of investigation is the Fred Davis #1 (M, 1, 25N, 3W) operated by Burlington Resources. The well bore was plugged and abandoned in 1999. (See Attached Pertinent Data Sheet.)
- VII. It is anticipated to inject about 1000 bbls. per day of produced water from the Pictured Cliffs, Mesa Verde and Dakota formations with a maximum anticipated rate of 1500 bbls. per day. The system will be an open system with the disposal fluid trucked to storage tanks from producing wells in the Jicarilla area. The injection facility will have enough capacity to store two days of injection fluid. It is anticipated to inject at 1.5 BPM at 800 psi with a maximum injection pressure of 1100 psi. If insufficient rate is established, a step rate test will be performed at time of completion. Attached are relative water samples of produced injection fluids and a representative water sample from the Mesa Verde.
- VIII. The Mesa Verde group is composed of the Cliff House Sandstone, the Menefee, and the Point Lookout formations. The Cliff House is mostly well sorted, fine grained, sub angular to sub rounded shore line sands. Very well cemented with silica and no visible intragranular porosity; mostly tight with silica and calcite fill.

The Menefee is composed of alternating channel and shore sandstones, shales, siltstones, and coals. The sandstones are white to tan, fine to medium grained, angular to sub rounded, and well cemented with silica. The shales are dark brown to black, soft to sticky and slightly brittle, with a greasy to resinous luster. They have a clay matrix supporting silt, carbonaceous flakes and laminations, some sand, and sometimes grade to carbonaceous shales. The siltstones are light to medium gray/tan to brown, speckled with dark carbonaceous flakes. Soft to firm, occasionally hard, earthy to sandy texture, poorly to moderately cemented with a slightly to non-calcareous cement. The coals are dark brown to black, intermediate to bright, resinous to vitreous luster, soft to hard, brittle, well cleated with some conchoidal fractures.

The Point Lookout is clear to white, speckled with clay blems, fine grained with occasional medium grains, poorly to moderately sorted, sub to well rounded. Well - cemented with silica, unconsolidated in places and some pyrite nodules.

Porosity in the Mesa Verde varies from 1 to 2% in some of the shales and siltstones to more than 20% in some of the sandstones. The Mesa Verde varies from approximately 700 to 1100 feet in thickness in the San Juan Basin and is overlain by the Lewis shale and overlies the Mancos shale.

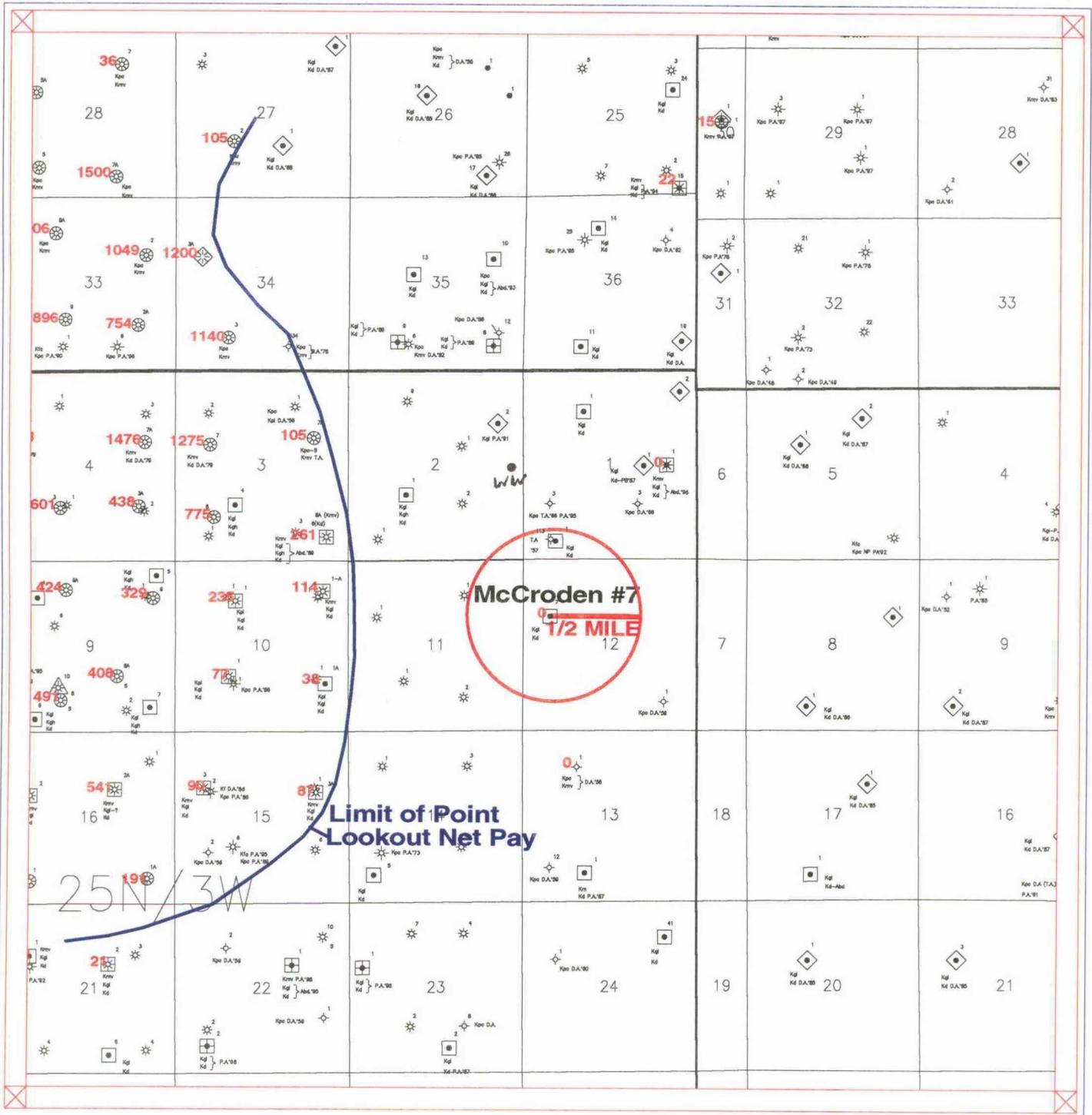
Overlying aquifers are the San Jose, Nacimiento and Ojo Alamo formations. The deepest in this wellbore is the Ojo Alamo from 3578'-3630'.

- IX. It is anticipated to complete the Mesa Verde in two stages. The Point Lookout will be perforated, acidized with 15% HCL and fracture treated with 100,000# of sand. The Cliffhouse and Menefee sands will be perforated, acidized and fracture treated with 100,000# of sand.
- X. Previously submitted by Schlumberger Wireline Services.
- XI. One fresh water well exists within the area of investigation. The Schmitz water well is located in the SE/4 NE/4 of Section 2, T25N, R3W. See attached survey plat and water analysis.
- XII. I, Gary W. Brink, P.E., have examined all available geological and engineering data and find no evidence of open faults or any other hydrologic connection between the anticipated disposal zones and any underground sources of drinking water.
- XIII. Proof of legal notice has been sent to the Rio Grande Sun, Espanola, NM and the Farmington Daily Times, Farmington, NM for advertisement. In addition, the surface land owner and offset operators have been furnished a copy of this application by certified mail.

I hereby certify that the information submitted with this application is true and correct to best of my knowledge and belief.



Gary W. Brink, P.E.
Production Superintendent



ENERGEN RESOURCES CORP.		
JICARILLA MCCRODAN #7 DISPOSAL WELL MESAVERDE GAS EUR DATA (MMCF)		
pete	Scale 1:54000.	12/5/00
	JICARILLA	SJBPROJ

BURLINGTON RESOURCES

Pertinent Data Sheet

Date: 12/12/00 **Well Name:** Fred Davis #1 **API#:** 30-039-23500 **DP#:**
Unit: M **Sec:** 1 **Twp:** 25N **Rge:** 3W **Footage:** 923' FSL 954' FWL
County: Rio Arriba **State:** NM **Spud:** 7/18/85 **Completed:** 9/5/85
Field: West Lindrith Gallup Dakota **Elev:** 7281' **TD:** 8370' **PBTD:** 8328' **KB:**
Perfs: GL: 7036'-7621'; Greenhorn: 7935'-7987'; Dakota: 8037'-8210'

Frac: GL: 200,000# sand in 25# X-linked gel; Greenhorn: Acidized w/250 gals 15% MSA & 1500 gals MSR;
 DK: 130,000# sand in 30# X-linked gel

Hole Size	Casing Size	Weight & Grade	Depth Set	Cement	TOC
12-1/4"	8-5/8"	24# K-55	352'	324 cf	Circ to surface
7-7/8"	4-1/2"	11.6# K-55	8370'	1st-927 cf	Circ
		DV Tool 6503'		1924 cf	Circ to surface
Tubing Size	# Joints	Weight & Grade	Depth Set	Seat Nipple	Packer

Rod & Pump Record:

Rod Size	# Rods	Length	Grade
----------	--------	--------	-------

Log Record:

Formation Tops:

Ojo Alamo	Menefee
Kirtland	Point Lookout
Fruitland	Mancos
Pictured Cliffs	Gallup
Lewis	Graneros
Cliffhouse	Dakota

Work History: P&A'D 5/26/99, Plug #1: 4-1/2" CIBP @ 7885' w/12 x to 7725, Plug #2: 4-1/2" CIBP @ 6986' w/12 sx to 6824', Plug #3: 13 sx from 5532'-5360', Plug #4: 46 sx from 3831'-3205', Plug #5: 11 sx from 1701'-1550', Plug #6: 39 sx from 410'-surface.



DIRECT OFFSET-RELATIVE MV SAMPLE

Water Analysis Report

To: Energen Resources Date: 12/13/2000
 Submitted by: Halliburton Energy Services Date Rec: 12/12/2000
 Attention: Gary Brink 326-8112 Report #: BLMMC735
 Well Name: McCroden #8A sample 1 Formation: MV
 9-25N-3W

*Anthrone test for broken gel — negative

Specific Gravity	1.010	
pH	8.02	
Resistivity	1.26	@ 70° F
Iron (Fe)	0	Mg / L
Potassium (K)	0	Mg / L
Sodium (Na)	5111	Mg / L
Calcium (Ca)	28	Mg / L
Magnesium (Mg)	17	Mg / L
Chlorides (Cl)	7300	Mg / L
Sulfates (SO ₄)	0	Mg / L
Carbonates (CO ₃)	80.0	Mg / L
Bicarbonates (HCO ₃)	1098	Mg / L
Total Dissolved Solids	13634	Mg / L

Respectfully: Stephanie Cheatham

Title: Associate Chemist

Location: Farmington, NM

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that Halliburton shall not be liable for any loss or damage whether due to act or omission resulting from such report or its use.



TYPE DISPOSAL FLUID

Water Analysis Report

To: Energen Date: 12/19/2000
 Submitted by: Halliburton Energy Services Date Rec: 12/17/2000
 Attention: Gary Brink 326-6112 Report #: BLMMB751
 Well Name: Jicarilla 99-10 Formation: PC
24-26N-3W

Anthrone test for broken gel — negative

Specific Gravity	1.010	
pH	5.44	
Resistivity	4.89	@ 70° F
Iron (Fe)	10	Mg / L
Potassium (K)	0	Mg / L
Sodium (Na)	537	Mg / L
Calcium (Ca)	20	Mg / L
Magnesium (Mg)	10	Mg / L
Chlorides (Cl)	840	Mg / L
Sulfates (SO ₄)	0	Mg / L
Carbonates (CO ₃)	0.0	Mg / L
Bicarbonates (HCO ₃)	122	Mg / L
Total Dissolved Solids	1538	Mg / L

Respectfully: Stephanie Cheatheam

Title: Associate Chemist

Location: Farmington, NM

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that Halliburton shall not be liable for any loss or damage whether due to act or omission resulting from such report or its use.



Type Disposal Fluid

Water Analysis Report

To: Energen Resources Date: 12/13/2000
 Submitted by: Halliburton Energy Services Date Rec: 12/13/2000
 Attention: Gary Brink 326-6112 Report #: BLMMA735
 Well Name: McCrodin #A1 sample 1 Formation: PC
 9-25N-3W

*Anthrone test for broken gel — negative

Specific Gravity	1.000	
pH	7.86	
Resistivity	2.21	@ 70° F
Iron (Fe)	0	Mg / L
Potassium (K)	0	Mg / L
Sodium (Na)	1254	Mg / L
Calcium (Ca)	12	Mg / L
Magnesium (Mg)	7	Mg / L
Chlorides (Cl)	1670	Mg / L
Sulfates (SO ₄)	0	Mg / L
Carbonates (CO ₃)	40.0	Mg / L
Bicarbonates (HCO ₃)	488	Mg / L
Total Dissolved Solids	3471	Mg / L

Respectfully: Stephanie Cheatham

Title: Associate Chemist

Location: Farmington, NM

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that Halliburton shall not be liable for any loss or damage whether due to act or omission resulting from such report or its use.



Type Disposal Fluid

Water Analysis Report

To: Energen Date: 12/19/2000
 Submitted by: Halliburton Energy Services Date Rec: 12/17/2000
 Attention: Gary Brink 326-6112 Report #: BLMMC751
 Well Name: Jicarilla 107-3 Formation: MV
 27-26N-4W

Anthrone test for broken gel -- negative

Specific Gravity	1.015	
pH	7.16	
Resistivity	2.31	@ 70° F
Iron (Fe)	0	Mg / L
Potassium (K)	0	Mg / L
Sodium (Na)	2323	Mg / L
Calcium (Ca)	40	Mg / L
Magnesium (Mg)	10	Mg / L
Chlorides (Cl)	3400	Mg / L
Sulfates (SO ₄)	0	Mg / L
Carbonates (CO ₃)	0.0	Mg / L
Bicarbonates (HCO ₃)	488	Mg / L
Total Dissolved Solids	6261	Mg / L

Respectfully: Stephanie Cheatham

Title: Associate Chemist

Location: Farmington, NM

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that Halliburton shall not be liable for any loss or damage whether due to act or omission resulting from such report or its use.



TYPE DISPOSAL FLUID

Water Analysis Report

To: Energen Date: 12/19/2000
 Submitted by: Halliburton Energy Services Date Rec: 12/17/2000
 Attention: Gary Brink 326-6112 Report #: BLMMA751
 Well Name: Jicarilla 94-2A Formation: MV
 27-27N-3W

Anthrone test for broken gel --- negative

Specific Gravity	1.015	
pH	8.02	
Resistivity	0.90	@ 70° F
Iron (Fe)	0	Mg / L
Potassium (K)	100	Mg / L
Sodium (Na)	5453	Mg / L
Calcium (Ca)	16	Mg / L
Magnesium (Mg)	2	Mg / L
Chlorides (Cl)	7500	Mg / L
Sulfates (SO ₄)	0	Mg / L
Carbonates (CO ₃)	80.0	Mg / L
Bicarbonates (HCO ₃)	1708	Mg / L
Total Dissolved Solids	14859	Mg / L

Respectfully: Stephanie Cheatham

Title: Associate Chemist

Location: Farmington, NM

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that Halliburton shall not be liable for any loss or damage whether due to act or omission resulting from such report or its use.



TYPE DISPOSAL FLUID

Water Analysis Report

To: Energen Date: 12/19/2000
 Submitted by: Halliburton Energy Services Date Rec: 12/17/2000
 Attention: Gary Brink 326-6112 Report #: BLMMF751
 Well Name: Jicarilla 123 C27 Formation: DK
 6-25N-4W

Anthrone test for broken gel — negative

Specific Gravity	1.015	
pH	7.75	
Resistivity	1.03	@ 70° F
Iron (Fe)	0	Mg / L
Potassium (K)	150	Mg / L
Sodium (Na)	4710	Mg / L
Calcium (Ca)	28	Mg / L
Magnesium (Mg)	10	Mg / L
Chlorides (Cl)	6300	Mg / L
Sulfates (SO ₄)	0	Mg / L
Carbonates (CO ₃)	0.0	Mg / L
Bicarbonates (HCO ₃)	2033	Mg / L
Total Dissolved Solids	13231	Mg / L

Respectfully: Stephanie Cheatham

Title: Associate Chemist

Location: Farmington, NM

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that Halliburton shall not be liable for any loss or damage whether due to act or omission resulting from such report or its use.



Type Disposal Fluid

Water Analysis Report

To: Energen Date: 12/19/2000
 Submitted by: Halliburton Energy Services Date Rec: 12/17/2000
 Attention: Gary Brink 326-8112 Report #: BLMMD751
 Well Name: Jicarilla 107 #9 Formation: GL-DK
 28-26N-4W

Anthrone test for broken gel --- negative

Specific Gravity	1.020	
pH	7.23	
Resistivity	0.96	@ 70° F
Iron (Fe)	0	Mg / L
Potassium (K)	150	Mg / L
Sodium (Na)	5031	Mg / L
Calcium (Ca)	157	Mg / L
Magnesium (Mg)	27	Mg / L
Chlorides (Cl)	7700	Mg / L
Sulfates (SO ₄)	400	Mg / L
Carbonates (CO ₃)	0.0	Mg / L
Bicarbonates (HCO ₃)	447	Mg / L
Total Dissolved Solids	13912	Mg / L

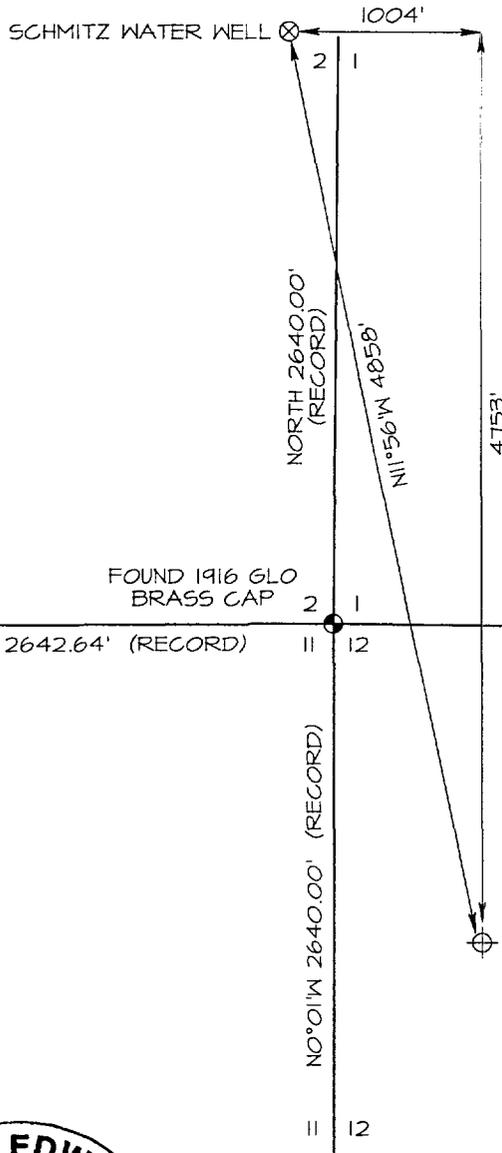
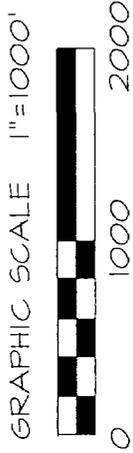
Respectfully: Stephanie Cheatham

Title: Associate Chemist

Location: Farmington, NM

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that Halliburton shall not be liable for any loss or damage whether due to act or omission resulting from such report or its use.

**ENERGEN RESOURCES CORPORATION McCRODEN #7
SKETCH SHOWING DISTANCE TO SCHMITZ WATER WELL
LOCATED IN SE/4 NE/4 OF SECTION 2, T25N, R3W
N.M.P.M., RIO ARriba COUNTY, NEW MEXICO**



BASIS OF BEARING:

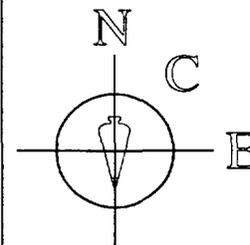
REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED ON DECEMBER 6, 2000 FROM A REFERENCE STATION POSITIONED IN THE SE/4 NE/4 OF SECTION 12, T25N, R3W



I Neale C. Edwards, a registered professional surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey and is true and correct to the best of my knowledge and belief.

Neale C. Edwards Date: December 13, 2000
Neale C. Edwards
N.M. R.L.S. #6857

Prepared for:
ENERGEN RESOURCES CORPORATION
2198 Bloomfield Highway
FARMINGTON, NM 87401



Land Surveyor:
Neale C. Edwards
Mailing Address:
Post Office Box 6612
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)

SURVEYS, INC.

SHEET 1 OF 1
CHECKED BY: NCE
DRAWN BY: SLT
FILENAME: 25312



Water Analysis Report

To: Energen Resources Date: 12/13/2000
Submitted by: Halliburton Energy Services Date Rec: 12/12/2000
Attention: Gary Brink 328-8112 Report #: BLMME735
Well Name: Shmitz H2O Well sample 1 Formation: _____

*Anthrone test for broken gel — negative

Specific Gravity	1.005	
pH	9.02	
Resistivity	7.85	@ 70° F
Iron (Fe)	0	Mg / L
Potassium (K)	0	Mg / L
Sodium (Na)	550	Mg / L
Calcium (Ca)	12	Mg / L
Magnesium (Mg)	5	Mg / L
Chlorides (Cl)	105	Mg / L
Sulfates (SO ₄)	800	Mg / L
Carbonates (CO ₃)	159.9	Mg / L
Bicarbonates (HCO ₃)	163	Mg / L
Total Dissolved Solids	1795	Mg / L

Respectfully: Stephanie Cheatham

Title: Associate Chemist

Location: Farmington, NM

NOTICE: This report is limited to the described sample tested. Any person using or relying on this report agrees that Halliburton shall not be liable for any loss or damage whether due to act or omission resulting from such report or its use.

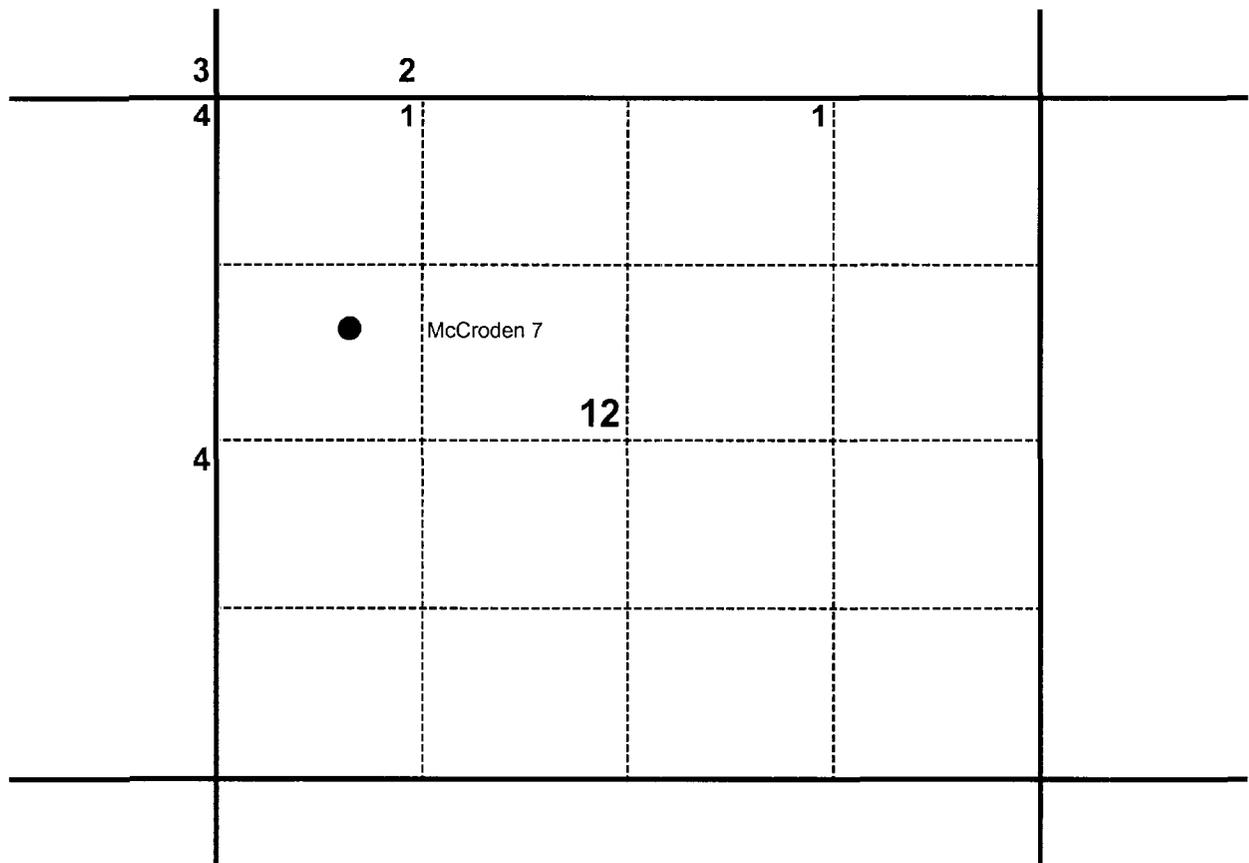
Energen Resources Corp.

McCroden #7

Offset Operator / Ownership Plat

SWD well Conversion

Township 25 N, Range 3 W



- 1) Energen Resources
- 2) Burlington Resources
P.O. Box 4289
Farmington, N.M. 87499
- 3) Minel Inc.
309 Washington SE
Albuquerque, N.M. 87108
- 4) Breck Operating
P.O. Box 911
Breckenridge, Tx 76024-0911